

Monitoring Belgian COVID-19 infections in work sectors in 2022

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1 Introduction

The workplace is among the main activities for a large proportion of the population, and consequently a source of potential infection. Hence, it is often (up to 25%) reported in the contact centre database as one of the collectivities visited by the index case. It is important to monitor the incidence of COVID-19 by sector as it can help us to better understand causes of increased infection rates and it can offer us ways to reduce infections without jeopardising the continuity of these sectors/companies for the benefit of all, first and foremost the companies and their workers. In contrary to previous reports only one source of information on infection in work sectors will be used: the RSZ/ONSS data. Due to changed policy concerning testing and contact tracing in March 2022, insufficient incidence data is available from the IDEWE contact tracing.

1.1 RSZ/ONSS data

The RSZ/ONSS data analyses of COVID-19 infections in the working population were set up in the first place to allow for signal detection. The alerts consist of 2 or more cases in the same company as well as the identification of employment of an index case in a risk sector as defined by the regional contact tracing agencies (daily alerts are sent by the RSZ/ONSS to the regions). Aggregated data show the evolution over time of the incidence in the sectors. It helps to better understand the spread of the virus in the active population. The latter is of interest here.

Data description: RSZ-ONSS has been receiving information regarding positive COVID-19 cases from Sciensano since 8 September 2020. RSZ-ONSS links this information to workplace-related databases, at the level of the national number (NISS). The linkage is allowed during a period of 14 days, after which the information on positive cases is destroyed, while the aggregated output tables are stored. Linkage is done of positive cases with the NSSO Dimona database of active workers since 8 September 2020. This covers most of the workers, such as private and public sectors, interim employment and job students. Since 12 January 2021, additional linkage of positive cases with the ARZA-RGTI (Algemeen Repertorium van de Zelfstandige Arbeiders - Répertoire Général des Travailleurs Indépendants) database was allowed, which covers self-employed workers.

Each company is classified by sector of its main activity (as attributed by the RSZ-ONSS), which are identified by the NACE code. This standard code classifies workplaces into 21 main sectors and then in subcategories for which the specificity depends on the chosen granularity (which can have up to 943 subcategories). However, although some companies or self-employed workers may be active in more than one sector, only one NACE number associated with the main activity is used in the analysis. This limitation is particularly important to consider for employees within national education. Because a vast majority of schools provide both primary and secondary education, the employees will be registered as working in “Secondary education” even when in reality they are primary school teachers.

Further, since the link of the cases is only identified at the level of the company, no information is available on the type of the job of the index case (e.g., administrative work in metal industry will be registered under metal industry). Further, information on the exact employment location is not always available and/or accurate (e.g., information on telework or temporary unemployment is not available).

Finally, the actual source of infection (in particular: at the workplace or elsewhere) cannot be traced back from this database. Thus, the size and extent of the database allows us to obtain a clear and precise picture of the level of infection within a given sector, without link to the source and circumstances of infection.

2 Methodology

2.1 COVID-19 14-day incidence

The data provided by RSZ/ONSS will be shown per work sector. Work sectors are divided by NACE codes and grouped into 5 levels of detail, going from 21 sectors at level 1 to 943 sectors at level 5. The evolution of the 14-day incidence of positive COVID-19 cases among all employees registered in the same sector (number of cases per 100,000 employees) is presented for the 5 levels of work sectors. A 95% confidence interval (CI)

for the incidence is calculated on a logit transformation of the incidence, after which it is backtransformed to the original scale.

At each of the 5 levels of detail of the work sectors, the highest incidences in the last 14-day period are selected (28 June– 11 July 2022) and presented together with the COVID-19 14-day incidence over all work sectors (~ 4.5 million individuals) and the COVID-19 14-day incidence in the general population (~ 11.5 million individuals) for reference.

Because the number of employees in some occupational sectors is low compared to others, the precision of the 14-day incidence is low in such small sectors. Therefore, we select the highest incidences for level 1 sectors with a minimum of 10,000 employees and self-employed workers. For level 2 and 3 sectors with a minimum of 5,000 employees and self-employed workers are selected, while for level 4 and level 5, sectors with a minimum of 3,000 and 1,500 employees, respectively, are selected.

Note that for 25% of the self-employed a sector is missing in the ARZA-RGTI data. Positive cases of self-employed worker with missing sector information are left out of the analysis. Linkage to occupational data shows that missing sector information is dispersed over many sectors, so that the impact of missing data is not affecting a single sector excessively. There will be a slight underestimation of the true incidence, but the ordering among sectors is likely not affected.

Finally, we cannot exclude varying testing preparedness and custom between sectors.

3 Results

This report is accompanied with an Excel sheet, listing all sectors and all NACE-BEL sectors for further examination.

3.1 Level 1 work sector

Of the 20 sectors at level 1, the sector with a 14-day incidence on 11 July 2022 significantly above the working population average is Human health and social work activities (sector Q) (Table 1 and Figure 1). The 14-day incidences continues to increase in all sectors, especially in the human health and social work sector. The working population average is 37.0% higher than the general population average.

14-day incidence of employees and self-employed at level 1

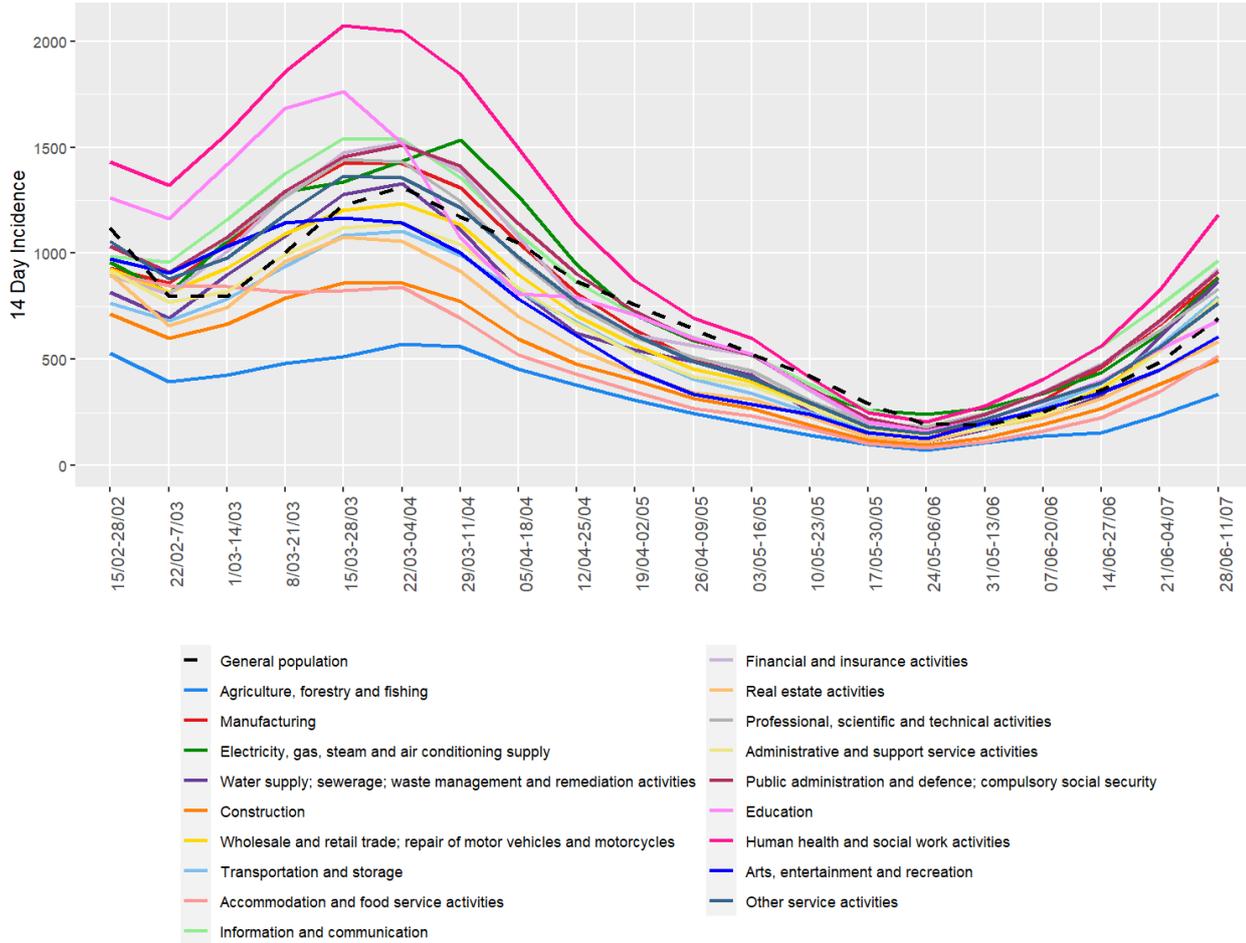


Figure 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 on 11 July 2022

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
Human health and social work activities	Q	686318	1184(1159;1210)	1213(1186;1240)	839(765;920)	8.04
Information and communication	J	188497	965(922;1010)	1103(1049;1160)	623(560;693)	29.49
Working population		4745426	951(942;960)	951(942;960)		
Financial and insurance activities	K	160237	928(882;976)	1061(1006;1119)	459(394;535)	22.17
Public administration and defence; compulsory social security	O	594869	916(892;941)	917(893;942)		0.18
Manufacturing	C	638782	887(864;910)	933(908;958)	479(428;535)	10.19
Electricity, gas, steam and air conditioning supply	D	21404	883(766;1018)	926(803;1068)		6.19
Water supply; sewerage; waste management and remediation activities	E	39125	869(782;966)	901(809;1003)		6.08
Professional, scientific and technical activities	M	401801	833(805;862)	1024(982;1067)	610(576;646)	46.85
Transportation and storage	H	320352	796(766;827)	824(792;857)	509(433;599)	9.05
Administrative and support service activities	N	456888	784(759;810)	830(802;859)	562(512;617)	17.81
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	869280	778(760;797)	853(831;875)	508(477;541)	22.17
Other service activities	S	162924	766(725;810)	951(888;1019)	566(516;621)	48.94
General population			694	694	694	
Education	P	764516	682(664;701)	679(661;698)	779(679;893)	3.55
Arts, entertainment and recreation	R	120525	609(567;655)	629(577;686)	568(499;647)	33.82
Real estate activities	L	59418	584(526;649)	732(635;844)	471(403;550)	57.65
Accommodation and food service activities	I	377326	516(494;539)	549(523;576)	374(332;422)	19.92
Construction	F	385743	498(476;521)	590(560;622)	358(329;389)	40.67
Agriculture, forestry and fishing	A	93750	336(301;375)	246(202;299)	406(355;464)	56.97

3.2 Level 2 work sector

In the sectors at level 2 with a minimum of 5,000 workers, the sectors with a 14-day incidence on 11 July 2022 above the working population average are: Air transport (sector 51), Human health activities (sector 86), Manufacturing sectors (sector 21, 26, 17, 20, 29), Insurance and pension funding (sector 65) and Social work activities without accommodation (sector 88) (Table 2 and Figure 2).

14-Days incidence at Level 2 Employees and Self-employed

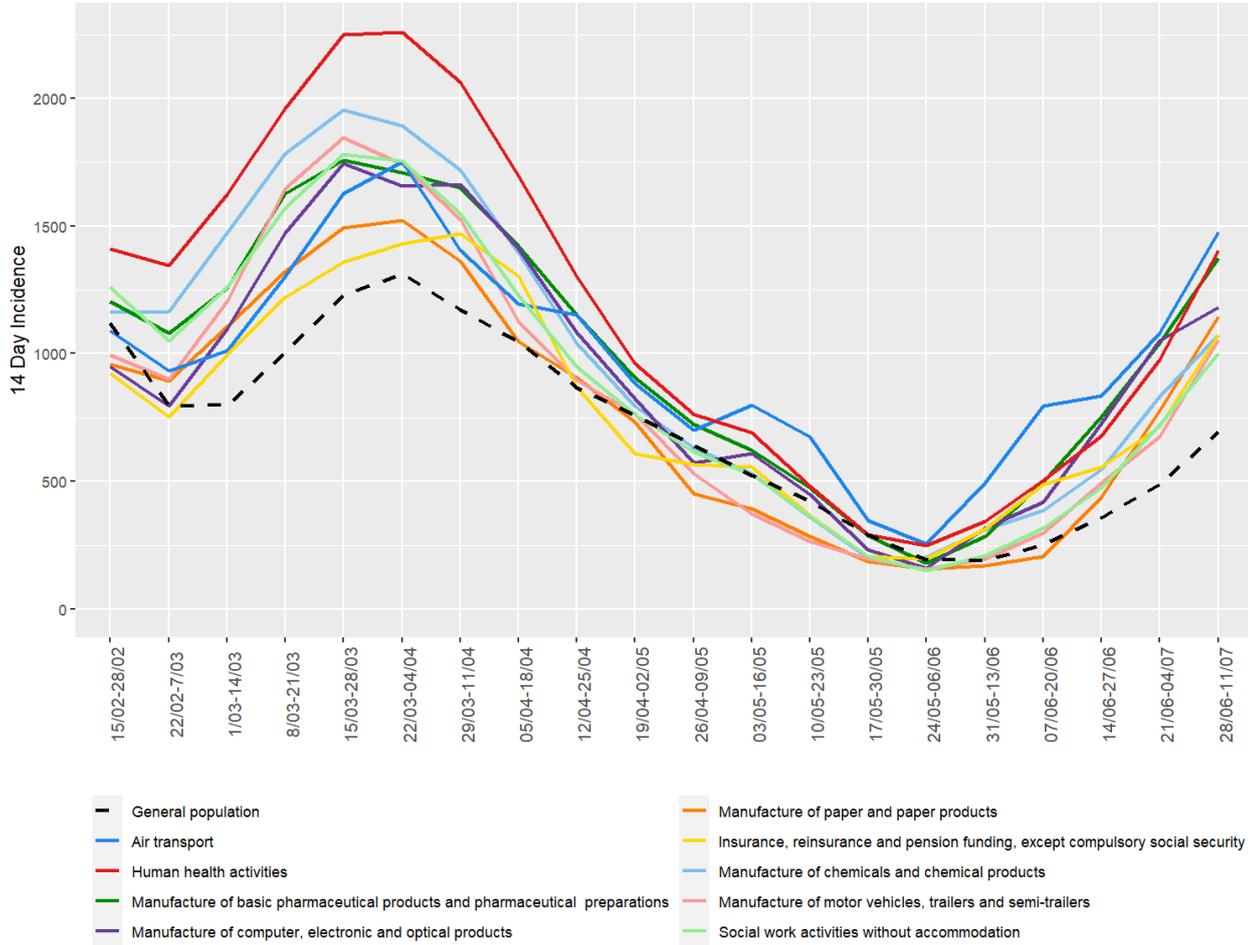


Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 on 11 July 2022

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
Air transport	51	7244	1477(1223;1782)	1494(1231;1813)		6.70
Human health activities	86	327137	1404(1364;1445)	1494(1450;1540)	867(787;955)	14.72
Manufacture of basic pharmaceutical products and pharmaceutical preparations	21	36099	1374(1259;1499)	1374(1259;1499)		1.27
Manufacture of computer, electronic and optical products	26	14129	1182(1016;1374)	1251(1073;1458)		8.37
Manufacture of paper and paper products	17	14473	1147(986;1334)	1170(1005;1362)		3.16
Insurance, reinsurance and pension funding, except compulsory social security	65	24302	1074(952;1212)	1080(956;1220)		3.24
Manufacture of chemicals and chemical products	20	49115	1073(986;1168)	1088(999;1185)		2.72
Manufacture of motor vehicles, trailers and semi-trailers	29	36682	1055(955;1165)	1055(954;1166)		2.04
Social work activities without accommodation	88	173427	1001(955;1049)	1013(966;1062)	645(463;897)	3.15
Working population		4745426	951(942;960)	951(942;960)		
General population			694	694	694	

3.3 Level 3 work sector

In the sectors at level 3 with a minimum of 5,000 workers, the sectors with a 14-day incidence on 11 July 2022 significantly above the working population average are: Hospital activities (sector 861), Passenger air and rail transport (sector 511, 491), Manufacturing sectors (sector 212, 283, 204, 172), Activities of trade unions (sector 942), Activities of call centres (sector 822), Compulsory social security activities (sector 843), Wholesale of information and communication equipment (sector 465), Medical and dental practice activities (sector 862), Other human health activities (sector 869), Insurance (sector 651) and Monetary intermediation (sector 641) (Table 3 and Figure 3).

The incidences in the higher education follow the increase in incidence of the working population average (Figure 4), while the incidence in the primary and secondary education follow is comparable to the general population. A comparison between primary and secondary schools is inaccurate based on the available data. Indeed, the NACE-BEL code for school employees is assigned to the main activity of the school. Hence, for

schools offering both primary and secondary education, all employees are counted as secondary education employees. Employees under the NACE-BEL code primary education are employees in schools that offer only primary education.

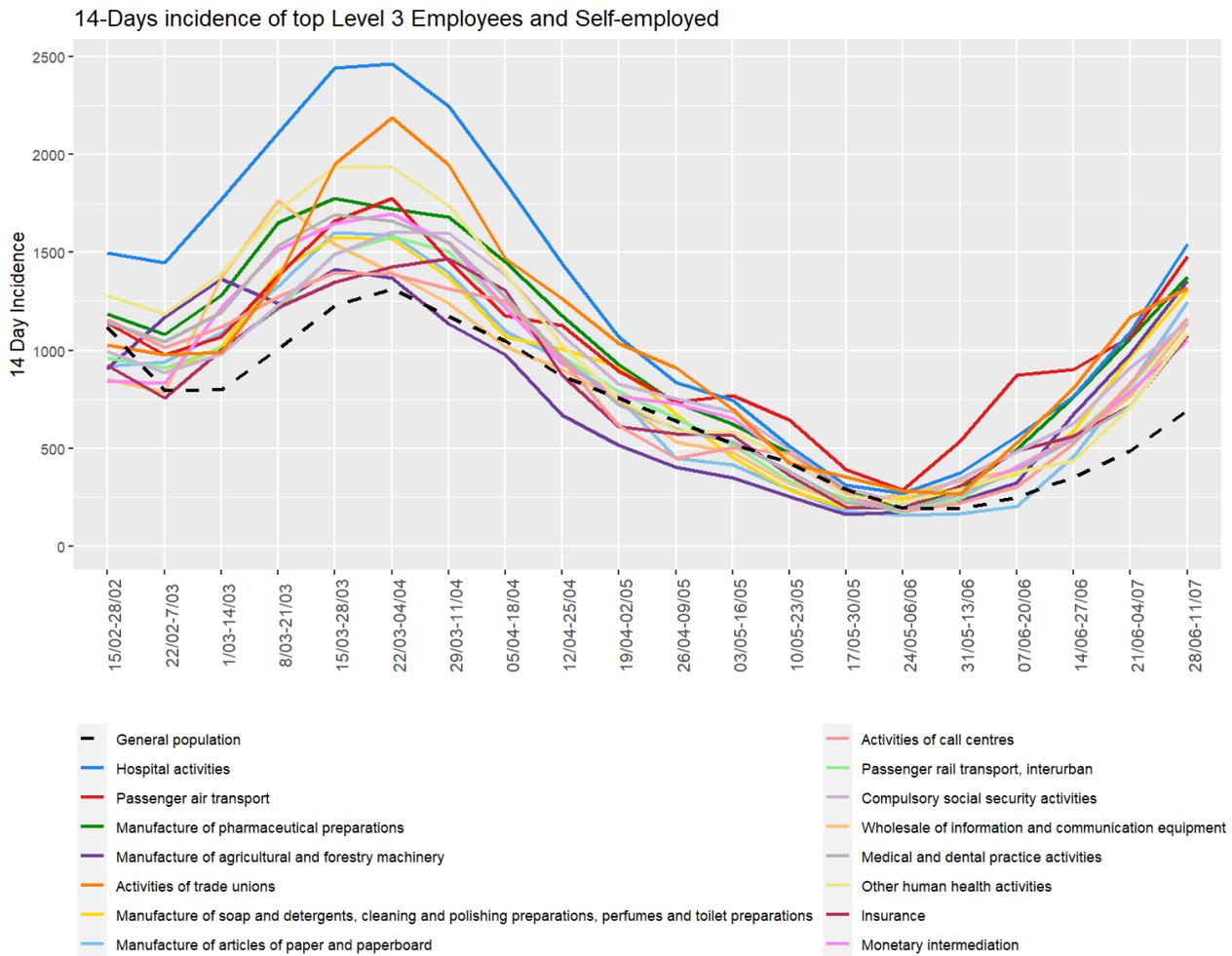


Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 in both employees and self-employed

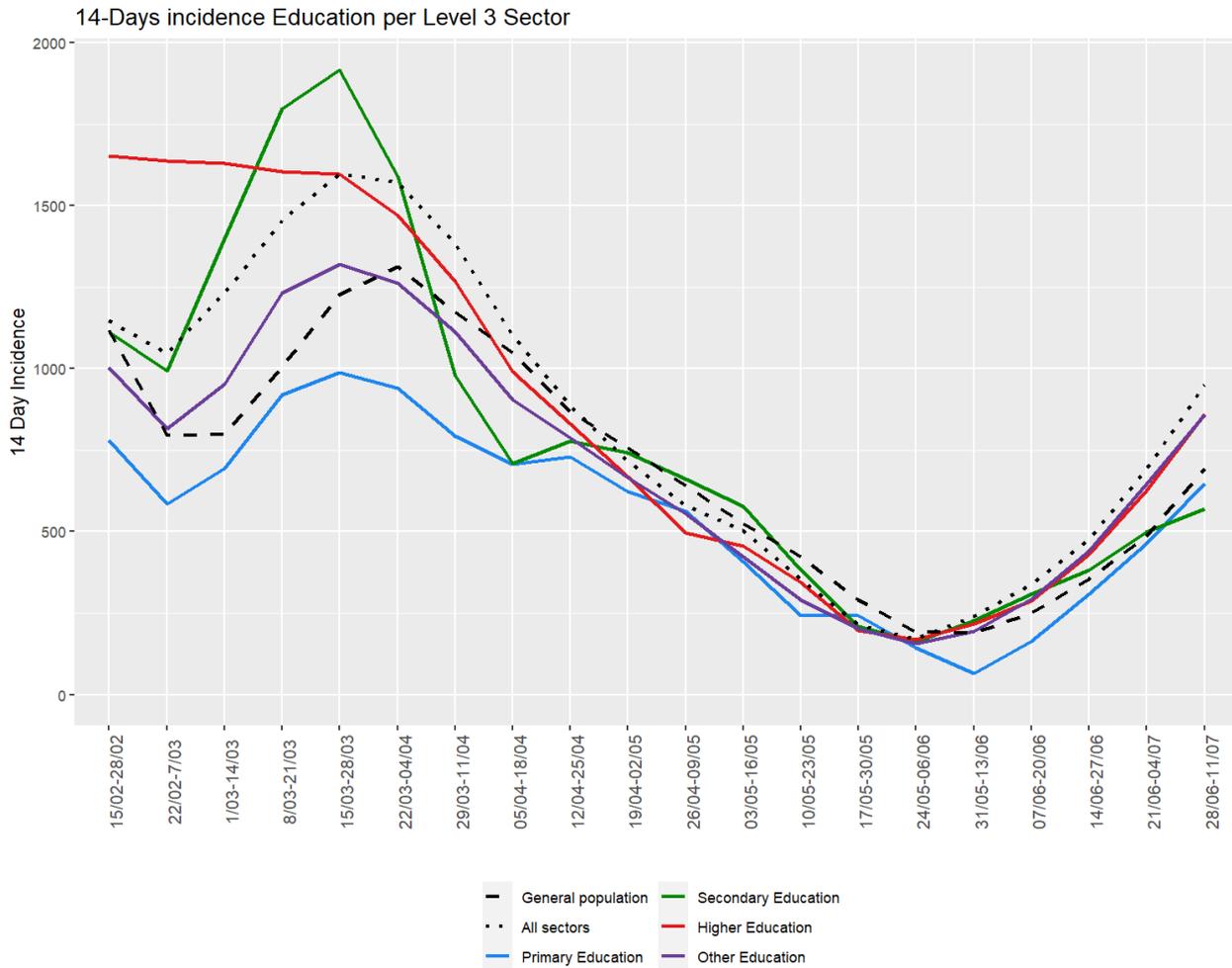


Figure 4: 14-Day incidence of COVID-19 infection in Education sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 11 July 2022

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
Hospital activities	861	226684	1544(1494;1596)	1546(1496;1598)		0.32
Passenger air transport	511	6486	1480(1213;1804)	1490(1213;1828)		6.88
Manufacture of pharmaceutical preparations	212	34132	1377(1259;1506)	1377(1259;1506)		0.91
Manufacture of agricultural and forestry machinery	283	7301	1356(1115;1649)	1381(1133;1682)		3.82
Activities of trade unions	942	5686	1319(1053;1651)	1319(1053;1651)		2.61
Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	204	7044	1306(1066;1599)	1390(1133;1704)		7.02
Manufacture of articles of paper and paperboard	172	10978	1248(1057;1474)	1272(1076;1504)		3.33
Activities of call centres	822	9185	1165(965;1406)	1165(965;1406)		2.30
Passenger rail transport, interurban	491	28952	1164(1047;1294)	1164(1047;1294)		0.08
Compulsory social security activities	843	33741	1144(1036;1263)	1146(1037;1266)		0.94
Wholesale of information and communication equipment	465	13480	1135(969;1328)	1191(1010;1404)	754(438;1294)	12.81
Medical and dental practice activities	862	46239	1090(999;1189)	1316(1181;1466)	831(718;961)	47.28
Other human health activities	869	55046	1090(1007;1180)	1244(1124;1377)	913(804;1037)	46.98
Insurance	651	23933	1078(955;1217)	1085(960;1227)		2.94
Monetary intermediation	641	48908	1053(966;1147)	1060(972;1155)		1.26
Working population		4745426	951(942;960)	951(942;960)		
General population			694	694	694	

3.4 Level 4 work sector

In the sectors at level 4 with a minimum of 3,000 workers, the sectors with a 14-day incidence on 11 July 2022 significantly higher than the working population average are: Manufacturing sectors (sector 2042, 2120, 2830, 2611, 1721, 2014), Hospital activities (sector 8610), Passenger air and rail transport (sector 5110, 4910), Other human resources provision (sector 7830), Activities of trade unions (sector 9420), General medical practice activities (sector 8621), Regulation of more efficient operation and businesses (sector 8413), Activities of call centres (sector 8220), Wholesale of computers and software (sector 4651), Compulsory social security activities (sector 8430), Other human health activities (sector 8690), Other monetary intermediation (sector 6419) and Other social work activities without accommodation (sector 8899) (Table 4 Figure 5).

14-Days incidence of top Level 4 Employees and Self-employed

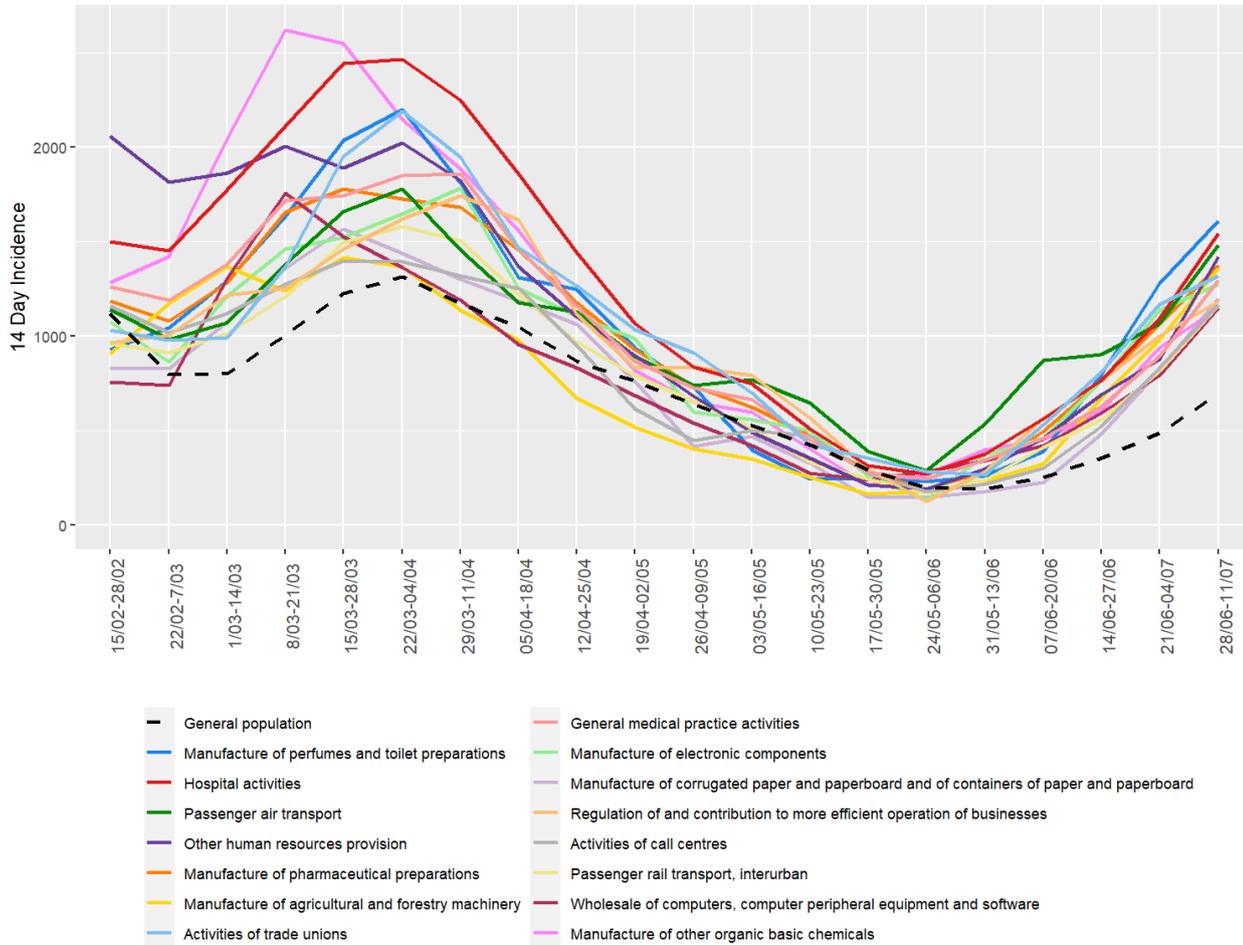


Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 11 July 2022

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
Manufacture of perfumes and toilet preparations	2042	3234	1608(1227;2104)	1608(1227;2104)		6.99
Hospital activities	8610	226684	1544(1494;1596)	1546(1496;1598)		0.32
Passenger air transport	5110	6486	1480(1213;1804)	1490(1213;1828)		6.88
Other human resources provision	7830	4789	1420(1121;1797)	1527(1201;1939)		9.77
Manufacture of pharmaceutical preparations	2120	34132	1377(1259;1506)	1377(1259;1506)		0.91
Manufacture of agricultural and forestry machinery	2830	7301	1356(1115;1649)	1381(1133;1682)		3.82
Activities of trade unions	9420	5686	1319(1053;1651)	1319(1053;1651)		2.61
General medical practice activities	8621	17361	1296(1138;1475)	1375(1189;1590)	1058(793;1410)	25.55
Manufacture of electronic components	2611	4713	1273(990;1636)	1273(990;1636)		5.16
Manufacture of corrugated paper and paperboard and of containers of paper and paperboard	1721	6667	1200(965;1492)	1220(980;1518)		2.89
Regulation of and contribution to more efficient operation of businesses	8413	9275	1186(985;1428)	1186(985;1428)		1.20
Activities of call centres	8220	9185	1165(965;1406)	1165(965;1406)		2.30
Passenger rail transport, interurban	4910	28952	1164(1047;1294)	1164(1047;1294)		0.08
Wholesale of computers, computer peripheral equipment and software	4651	10435	1150(962;1374)	1187(984;1431)		12.79
Manufacture of other organic basic chemicals	2014	13066	1148(979;1346)	1137(968;1335)		1.06
Compulsory social security activities	8430	33741	1144(1036;1263)	1146(1037;1266)		0.94
Other human health activities	8690	55046	1090(1007;1180)	1244(1124;1377)	913(804;1037)	46.98
Other monetary intermediation	6419	46825	1055(966;1152)	1062(973;1160)		1.22
Other social work activities without accommodation n.e.c.	8899	93738	1038(975;1105)	1051(987;1120)	684(455;1027)	3.61
Working population		4745426	951(942;960)	951(942;960)		
General population			694	694	694	

3.5 Level 5 work sector

In the sectors at level 5 with a minimum of 3,000 workers, the sectors with a 14-day incidence on 11 July 2022 significantly higher than the working population average are: Activities of medical laboratories (sector 86901), Manufacturing sectors (sector 20420, 21201, 28300, 26110, 17210, 20140), Specialized and general hospitals (sector 86101, 86103, 86104), Passenger air and rail transport (sector 51100, 49100), Other human resources provision (sector 78300), Associations for adults and activities of trade unions (sector 94992, 94200), General medical practice activities (sector 86210), Non-life insurance and health insurance (sector 65121, 84302), Regulation of more efficient operation and businesses (sector 84130), Wholesale of computers and software (sector

46510), Federal and regional government (sector 84111, 84112), Sheltered workshops (sector 88995), Other monetary intermediation (sector 64190) and Public Centres for Social Welfare (OCMW) (sector 84115) (Table 5 and Figure 6).

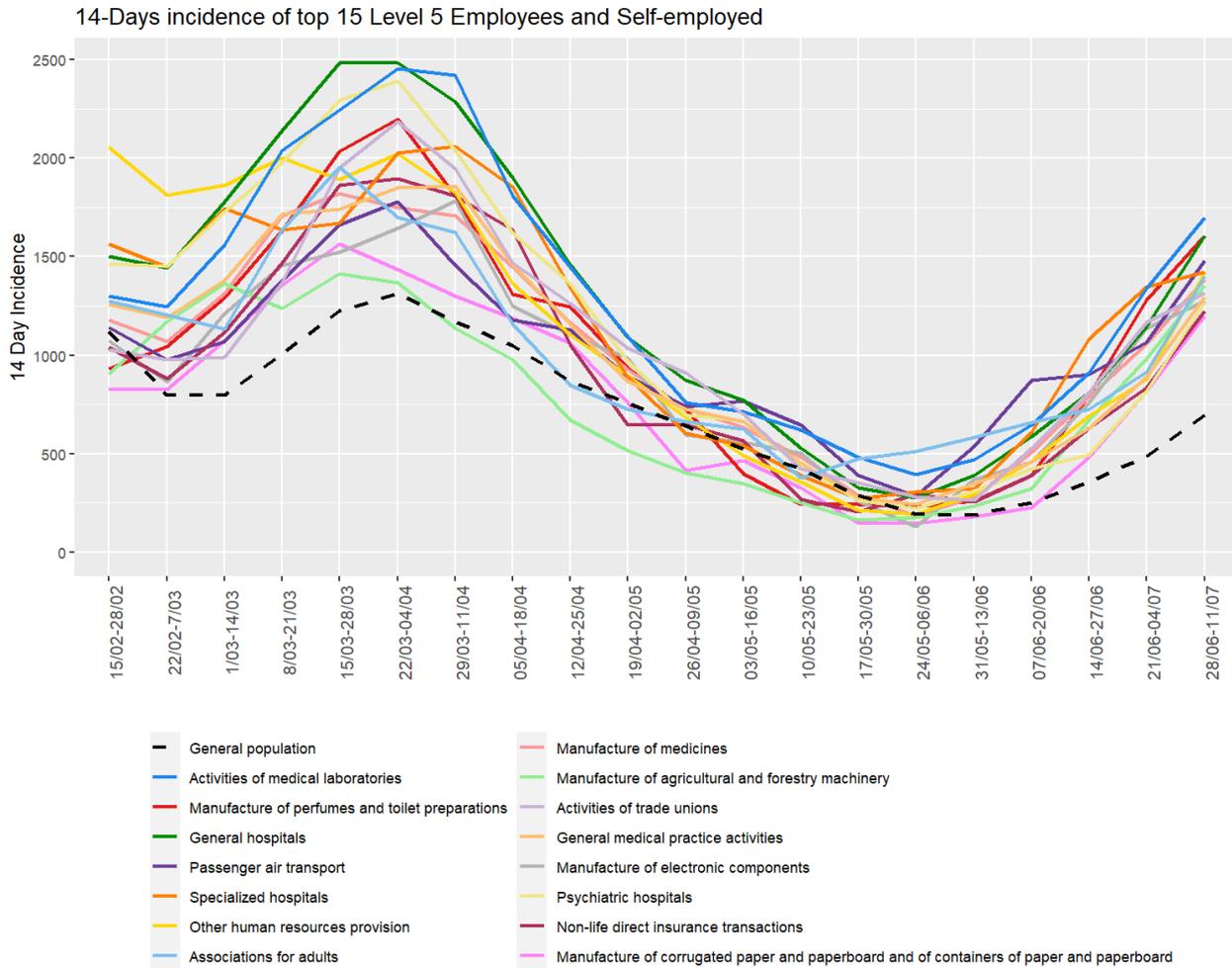


Figure 6: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 11 July 2022

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
Activities of medical laboratories	86901	6584	1701(1415;2043)	1809(1498;2184)		10.98
Manufacture of perfumes and toilet preparations	20420	3234	1608(1227;2104)	1608(1227;2104)		6.99
General hospitals	86101	181767	1607(1550;1666)	1608(1551;1667)		0.25
Passenger air transport	51100	6486	1480(1213;1804)	1490(1213;1828)		6.88
Specialized hospitals	86103	6114	1423(1155;1753)	1423(1155;1753)		1.13
Other human resources provision	78300	4789	1420(1121;1797)	1527(1201;1939)		9.77
Associations for adults	94992	3207	1403(1049;1874)			14.02
Manufacture of medicines	21201	32321	1383(1261;1516)	1383(1261;1516)		0.66
Manufacture of agricultural and forestry machinery	28300	7301	1356(1115;1649)	1381(1133;1682)		3.82
Activities of trade unions	94200	5686	1319(1053;1651)	1319(1053;1651)		2.61
General medical practice activities	86210	17361	1296(1138;1475)	1375(1189;1590)	1058(793;1410)	25.55
Manufacture of electronic components	26110	4713	1273(990;1636)	1273(990;1636)		5.16
Psychiatric hospitals	86104	37964	1267(1159;1385)	1266(1158;1384)		0.31
Non-life direct insurance transactions	65121	5224	1225(960;1562)	1223(953;1569)		4.51
Manufacture of corrugated paper and paperboard and of containers of paper and paperboard	17210	6667	1200(965;1492)	1220(980;1518)		2.89
Health insurance funds	84302	18364	1198(1050;1366)	1196(1048;1365)		0.75
Regulation of and contribution to more efficient operation of businesses	84130	9275	1186(985;1428)	1186(985;1428)		1.20
Activities of call centres	82200	9185	1165(965;1406)	1165(965;1406)		2.30
Passenger rail transport, interurban	49100	28952	1164(1047;1294)	1164(1047;1294)		0.08
Wholesale of computers, computer peripheral equipment and software	46510	10435	1150(962;1374)	1187(984;1431)		12.79
Manufacture of other organic basic chemicals	20140	13066	1148(979;1346)	1137(968;1335)		1.06
Federal government	84111	30018	1126(1013;1252)	1126(1013;1252)		0.03
Sheltered workshops	88995	50136	1101(1013;1196)	1108(1020;1204)		1.02
Governments of communities and regions	84112	46075	1070(980;1168)	1069(979;1167)		0.12
Other monetary intermediation	64190	46825	1055(966;1152)	1062(973;1160)		1.22
Public Centers for Social Welfare (O.C.M.W.)	84115	87716	1042(977;1111)	1042(977;1111)		0.15
Working population		4745426	951(942;960)	951(942;960)		
General population			694	694	694	

Finally, when considering specifically the non-medical contact professions, we see that the incidence in the

employees is higher compared to the self-employed, but it remains below or equal to the working and general population average. Additionally, the incidence in the beauty saloons is higher compared to the incidence in the hairdressers. (Figure 7).

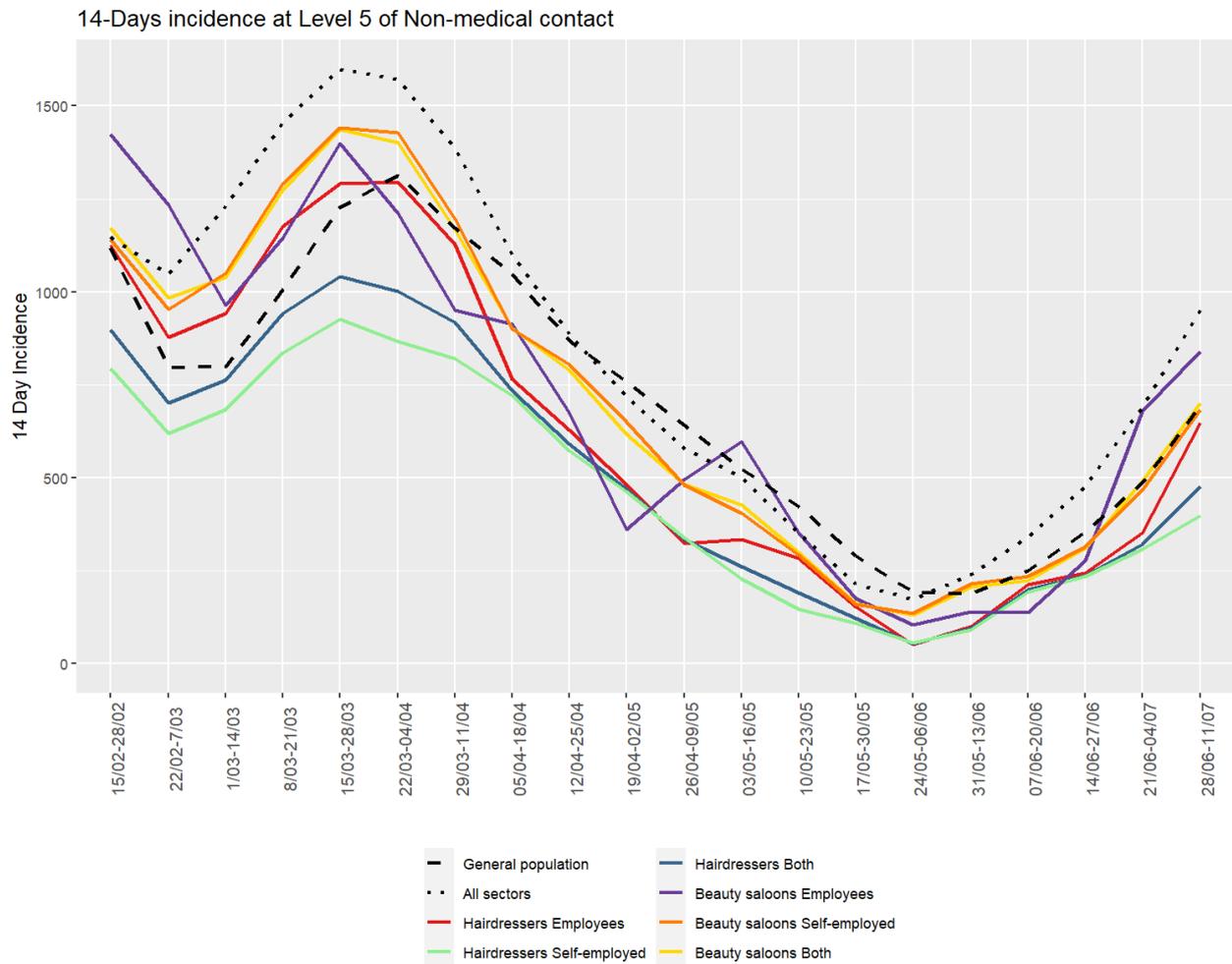


Figure 7: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

3.6 Additional analyses

3.6.1 Cross-level overview

When contemplating the 14-day incidences across NACE-BEL sectors, it is possible to gauge the contribution of each sub-level sector to the higher level incidence (Figure 8).

The 14-day incidence in the Human health and social work sector (sector Q) is elevated compared to the working and general population (Figure 8), which is mainly caused by the hospitals, general practitioners and social work without accommodation subsectors.

Although the 14-day incidence in Public administration and defence (sector O), Financial and insurance activities (sector K), Administration and support service activities (sector N), Other service activities (sector S) and Transportation and storage (sector H) is around or below the working population average, individual subsectors show an increased incidence compared to the working population, such as Passenger air and rail transport (sector 5110, 4910), Associations activities (sector 94200, 94992, 94994), Federal and regional government (sector 84111, 84112), OCMW (sector 84115), Regulation of efficient operation and businesses (sector 8413), Health insurance (sector 84302), Other monetary intermediation (sector 6419), Other human resources provision (sector 7830) and Call centres (sector 8220).

It is encouraging that the incidence in Accommodation and food service activities (sector I), Arts, entertainment and recreation (sector R) and Education (sector P) is similar to or below the general population average.

The sectors Manufacturing (sector C) and Wholesale and retail trade (sector G) are sectors with the highest number of sublevels. This results in large differences in 14-day incidences within the sector. While several manufacturing sectors show an increased incidence, none but one wholesale and retail sector shows an elevated incidence above the working population average (Figure 8).

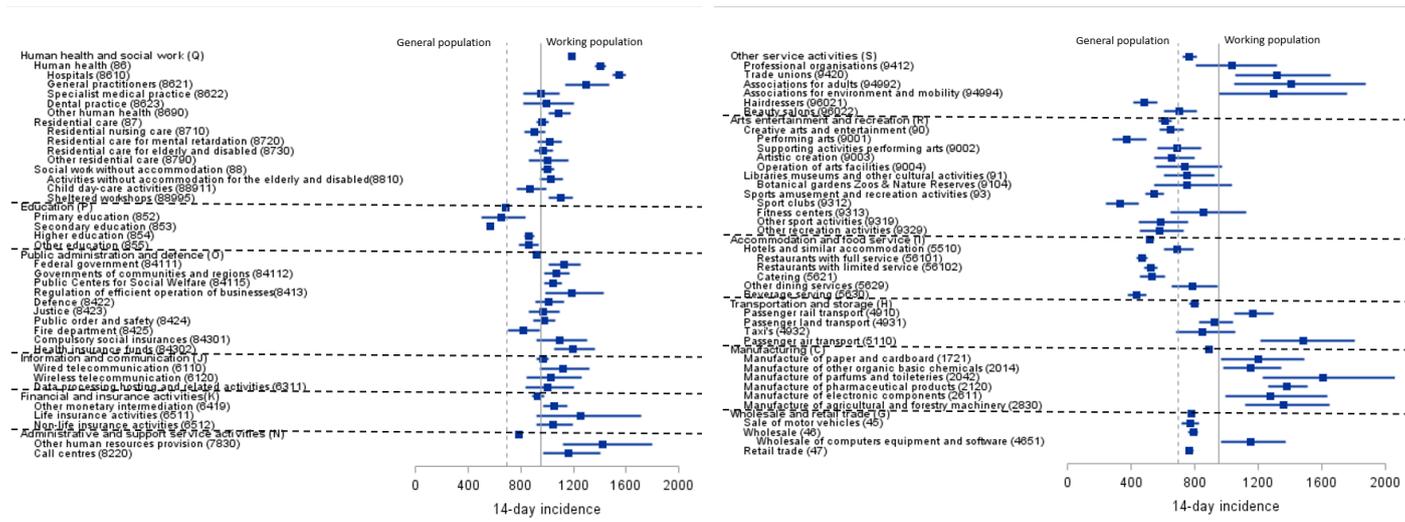


Figure 8: Forest plot of 14-Day incidence and 95% CI of selected sectors on 11 July 2022 in both employees and self-employed.

4 Conclusion

Despite the limitations of the data, the RSZ/ONSS data demonstrates an increase in the 14-day COVID-19 incidences in all sectors. The highest incidences are present in the health care sector, passenger air and rail transport and manufacturing. The average incidence in the working population is 37.0% higher than the average incidence in the general population and doubled in two weeks time, suggesting that infections are increasing mostly in working adults than in children and the elderly. Although the changed testing procedure in schools and the general population may influence this comparison.

Vigilance is required in especially human health, social work, passenger air and rail transport and public administration sectors since they're not able to telework.

Although no conclusions can be drawn regarding the location of infection (workplace or elsewhere) nor the location of employment (at work, telework, or temporarily unemployed) of the employees in the RSZ/ONSS data, the contact tracing in the segments under surveillance by IDEWE showed that in the index cases, where this information was available, 7% indicated that the workplace was certainly the source of infection. Due to changed testing policy in March 2022, insufficient data is available from the contact tracing to provide accurate results.

It is important to carefully monitor the incidence of COVID-19 in all sectors, especially sectors with frequent high risk contacts with an increased incidence compared to the working population average. Passenger air and rail transport, Hospital activities, General practitioners, activities of associations, human resources provision, social work without accommodation, public administration and some manufacturing sectors all show an increased incidence compared to the general population average and require continuous careful attention.

For some sectors the reason for the higher incidences is not immediately obvious, such as Activities of medical laboratories, Non-life insurance and health insurance activities, Activities of call centres and Other monetary intermediation. It would be worthwhile to evaluate the hygiene protocols and its practice in these sectors.

The incidence in non-medical contact professionals is below or equal to the working and general population average, with higher incidences in employees compared to self-employed professionals. The incidence in employees of beauty saloons is slightly higher compared to hairdressers.

It is encouraging to note that employees in accommodation and food services, education, arts, entertainment and recreation and wholesale and retail sectors are well protected, as they are often not able to telework.

Despite the high degree of vaccination, COVID-19 infection remains possible. Continuous monitoring of breakthrough infections, despite primo and booster vaccination, is warranted and additional booster vaccination for high risk employees in the health care sector should be considered.

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